

D-Link[®]

DES-1032 10/100 Fast Ethernet Switch

User's Guide

Printed In Taiwan



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4. Um eine Beschädigung des Gerätes zu vermeiden sollten Sie nur Zubehörteile verwenden, die vom Hersteller zugelassen sind.
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6. Bei der Aufstellung des Gerätes ist auf sichern Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen. Verwenden Sie nur sichere Standorte und beachten Sie die Aufstellhinweise des Herstellers.
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8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Die Netzanschlußsteckdose muß aus Gründen der elektrischen Sicherheit einen Schutzleiterkontakt haben.
10. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
11. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
12. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
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14. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.
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 - b – Flüssigkeit ist in das Gerät eingedrungen.
 - c – Das Gerät war Feuchtigkeit ausgesetzt.
 - d – Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
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18. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden, Für einen Nennstrom bis 6A und einem Gerätegewicht gr ßer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm² einzusetzen.

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ABOUT THIS GUIDE

Congratulations on your purchase of the DES-1032 10/100 Fast Ethernet Switch. The DES-1032 integrates Port Trunking and VLAN network capabilities in a highly flexible package.

Purpose

The purpose of this manual is to discuss the installation and use of your DES-1032 10/100 Fast Ethernet Switch.

Overview of this User's Guide

- ◆ Chapter 1, *Introduction*. Describes the DES-1032 and its features.
- ◆ Chapter 2, *Unpacking and Setup*. Helps you get started with the basic installation of the DES-1032.
- ◆ Chapter 3, *Identifying External Components*. Describes the front panel, rear panel, and LED indicators of the DES-1032.
- ◆ Chapter 4, *Connecting the DES-1032*. Tells how you can connect the DES-1032 to your Ethernet network.
- ◆ Chapter 5, *Programming the DES-1032*. This chapter describes the programmable parameters of the *DES-1032* and use of the configuration program.

- ◆ Appendix A, *Technical Specifications*. Lists the technical (general, physical and environmental, and performance) specifications of the *DES-1032*.
- ◆ Appendix B, *RJ-45 Pin Specification*. Describes the RJ-45 receptacle/connector and the straight and crossover cable connector.

1

INTRODUCTION

This section describes the features of the DES-1032, as well as giving some background information about Ethernet/Fast Ethernet switching technology.

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, Fast Ethernet, or 100BASE-T, provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolutionary nature, and the dominating potential market base, virtually guarantee cost effective and high performance Fast Ethernet solutions in the years to come.

100Mbps Fast Ethernet is a standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and takes advantage of the company's existing investment in hardware, software, and personnel training.

Switching Technology

Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by making it possible for a local area network to be divided into different *segments* which don't compete with each other for network transmission capacity, giving a decreased load on each.

The switch acts as a high-speed selective bridge between the individual segments. Traffic that needs to go from one segment to another is automatically forwarded by the switch, without interfering with any other segments. This allows the total network capacity to be multiplied, while still maintaining the same network cabling and adapter cards.

For Fast Ethernet networks, a switch is an effective way of eliminating problems of chaining hubs beyond the "two-repeater limit." A switch can be used to split parts of the network into different collision domains, making it possible to expand your Fast Ethernet network beyond the 205 meter network diameter limit for 100BASE-TX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between existing 10Mbps networks and new 100Mbps networks.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router and the setup and maintenance required make routers relatively impractical. Today's switches are an ideal solution to most kinds of local area network congestion problems.

Trunking Technology

Basically, trunking is a method of adding multiple physical links into a single logical link, thus increasing the throughput of the logical link by adding the physical link's relevant throughputs as well. In other words, trunking is a method to treat multiple physical links as a single logical link (link aggregation). Without trunking, the maximum bandwidth in a link is determined by the media speed of the link. The benefit of trunking is to be able to group multiple lower speed links into one higher speed link.

Other benefits of trunking include:

- **Scalability** Trunking gives Network and MIS managers a building block, providing a smooth transition from today's Fast Ethernet to tomorrow's Gigabit Ethernet.
- **Congestion Relief** Existing equipment can be utilized more efficiently by relieving the congestion between the *DES-1032* and the server. Connections to a server can be made simply by adding more network interface cards.

VLAN (Virtual Local Area Network)

A VLAN is a group of end-stations that are not constrained by their physical location and can communicate as if in a common broadcast domain, a LAN. The primary utility of using VLAN is to reduce latency and need for routers, using faster switching instead. Other VLAN utility include:

- **Virtual Workgroups** These are workgroups that have been formed for a limited time. During this time, communication between workgroup members will be high. A VLAN will eliminate the need for a router for workgroup communication, thus, increasing performance.

- **Security** Security is increased with the reduction of opportunity for eavesdropping on a broadcast network because data will be switched to only those confidential users within the VLAN.
- **Cost Reduction** VLANs can be used to create multiple broadcast domains, thus eliminating the need for expensive routers.

Port-based (or port-group) VLAN is the most common method of implementing a VLAN, and is the one supplied in the DES-1032. Each DES-1032 port can belong from one to thirty-two VLAN. And each DES-1032 can store configuration information on up to 16 VLAN.

Features

The DES-1032 is designed for easy installation and high performance in an environment where traffic on the network and the number of users increase continuously.

The DES-1032 is specifically designed to relieve the bottleneck between the server and DES-1032. The design improves performance (bandwidth) between the workstations and server. The DES-1032 can provide immediate access to a rapidly growing network through a wide range of user-reliable functions.

The DES-1032 is ideal for deployment with multiple graphics workstations demanding a fast flow of data from a single high-speed server. The DES-1032's trunking ability, it's main feature, permits up to an 800 Mbps Ethernet connection (full-duplex) using existing equipment. In full-duplex mode, any four ports can provide their workstations with simultaneous access, congestion-free 800 Mbps data pipe to the server.

The DES-1032 is expandable by cascading two or more DES-1032s together. All ports support 200 Mbps full-duplex, so the DES-1032s can be cascaded from any port to any number of DES-1032s.

The DES-1032 is a perfect choice for sites planning to upgrade to Gigabit Ethernet.

The DES-1032 combines dynamic memory allocation with store-and-forward switching to ensure that the buffer is effectively allocated for each port while data flow is controlled between the transmitting and receiving nodes to guarantee against all possible packet loss.

The DES-1032 is unmanaged, but it is smart, 10/100 Fast Ethernet switch that can improve the performance of multiple workstations using shared resources.

Performance features

- ◆ Provides 2 to 4 ports for one trunking, and it can be up to 800 Mbps data links, depending on the model.
- ◆ Supports up to 32 port-based VLANs.
- ◆ 32 UTP/STP ports (depending on model) all come with Nway auto-Negotiation and operate at 10/100 Mbps for connection to servers and hubs. All ports can auto-negotiate for full or half-duplex operation.
- ◆ One up-link kit to cascade 2 devices in 200 Mbps full-duplex mode or adapt to an external interface with 2 km connectivity (100BASE-FX).
- ◆ Store and forward switching scheme capability to support rate adaptation and ensure data integrity.
- ◆ Auto-polarity detection for correction of incorrect polarity on the receive twisted pair at each port.
- ◆ Data forwarding rate 148,800 pps per port at 100% of wire-speed for 100Mbps speed.
- ◆ Data forwarding rate 14,880 pps per port at 100% of wire-speed for 10Mbps speed.

- ◆ Data filtering rate eliminates all error packets, runts, etc. at 148,800 pps per port at 100% of wire-speed for 100Mbps speed.
- ◆ Data filtering rate eliminates all error packets, runts, etc. at 14,880 pps per port at 100% of wire-speed for 10Mbps speed.
- ◆ 1K active address entry table per device with self-learning and table aging.
- ◆ 1 MB packet buffer per eight ports.
- ◆ Optional IEEE802.3x flow control for full duplex and backpressure flow control for half duplex.

2

UNPACKING AND SETUP

This chapter provides unpacking and setup information for the DES-1032es.

Unpacking

Open the shipping carton of the DES-1032 and carefully unpack its contents. The carton should contain the following items:

- ◆ One DES-1032 10/100 Fast Ethernet DES-1032
- ◆ One AC power cord
- ◆ One IEEE 1284 compliant parallel printer cable
- ◆ This User's Guide
- ◆ Diskette containing configuration software
- ◆ Four rubber feet with adhesive backing
- ◆ Screws and two L-type brackets for rack mounting

If any item is missing or damaged, please contact your local D-Link Reseller for replacement.

Setup

The setup of the DES-1032 can be performed using the following steps:

- ◆ The surface must support at least 5kg.
- ◆ The power outlet should be within 1.84 meters (6 feet) of the device.
- ◆ Visually inspect the power cord and see that it is fully secured to the AC power connector.
- ◆ Make sure that there is proper heat dissipation from and adequate ventilation around the DES-1032. Do not place heavy objects on the DES-1032.

Desktop or Shelf Installation

When installing the DES-1032 on a desktop or shelf, the rubber feet included with the device must first be attached. Attach these cushioning feet on the bottom at each corner of the device. Allow enough ventilation space between the device and the objects around it.

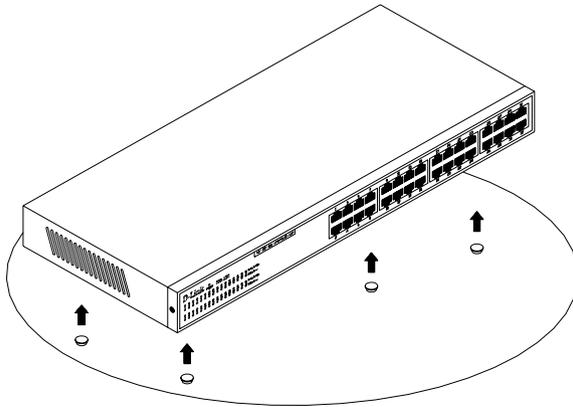


Figure 2.1 10/100 Fast Ethernet DES-1032 installed on a Desktop or Shelf

Rack Installation

The DES-1032 can be mounted in an EIA standard size, 19-inch rack, which can be placed in a wiring closet with other equipment. To install, attach the mounting brackets on the DES-1032's front panel (one on each side) and secure them with the screws provided.

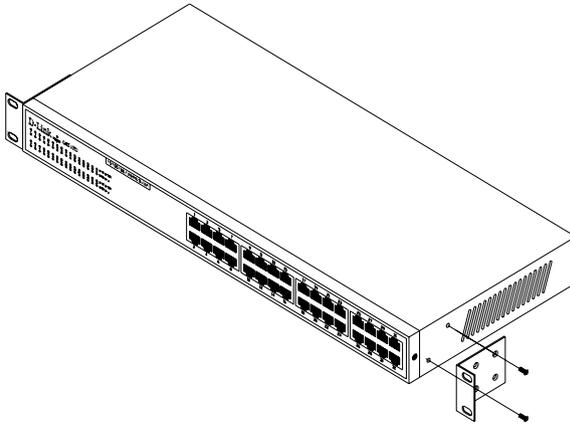


Figure 2.2 Attaching the mounting brackets to the 10/100 Fast Ethernet DES-1032

Then, use the screws provided with the equipment rack to mount the DES-1032 in the rack.

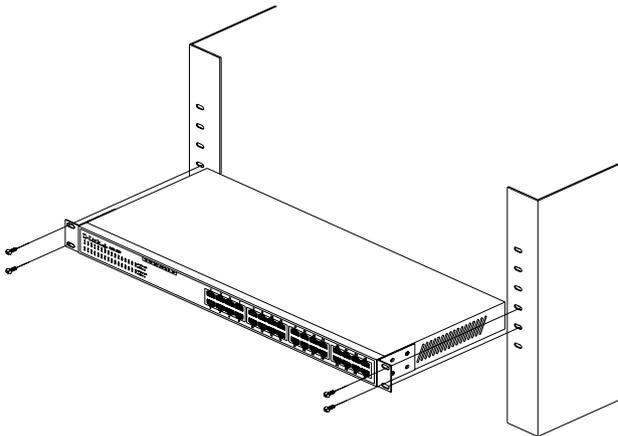


Figure 2.3 Installing the DES-1032 in an equipment rack

Power on

The DES-1032 can be used with AC power sources 100 - 240 VAC, 50 - 60 Hz. To turn the DES-1032 on, plug the AC adapter into the nearby outlet.

LED Indicators

After the switch is turned on, the LED indicators should respond as follows:

- ◆ All of the LED indicators will blink momentarily. This blinking of the LED indicators represents a reset of the system.
- ◆ The power LED indicator will remain ON.

Power Failure

As a precaution, the DES-1032 should be turned **OFF** in case of a power failure. When power is resumed, turn the DES-1032 **ON**. At all times, avoid leaving the DES-1032 ON if a power failure is anticipated.

3

IDENTIFYING EXTERNAL COMPONENTS

This chapter describes the front panel, rear panel, and LED indicators of the DES-1032.

Front Panel

The front panel of the DES-1032 consists of 32 (10/100 Mbps MDI-X) ports in the DES-1032 and LED indicators. A description of the ports appear in the *Introduction* of this User's Guide (see *Features*, Chapter 1).

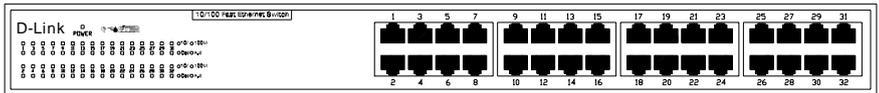


Figure 3.1 Front panel view of the DES-1032

Rear Panel

The rear panel of the DES-1032 consists of a power switch, an AC power connector and two system fans.

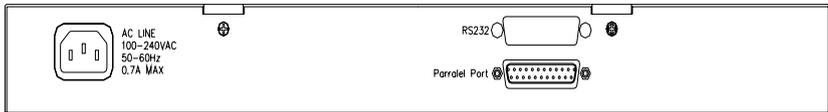
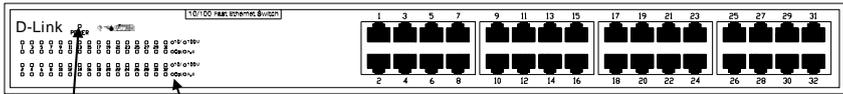


Figure 3.2 Rear panel view of the DES-1032

- ◆ **System Fans** The fans are used to circulate air inside the DES-1032 and also to dissipate heat. The sides of the system also provide heat vents to serve the same purpose. Do not block these openings, and leave adequate space at the rear and sides of the DES-1032 for proper ventilation. Be reminded that without proper heat dissipation and air circulation, system components might overheat, which could lead to system failure.
- ◆ **AC Power Connector** This is a three-pronged connector that supports the power cord. Plug in the female connector of the provided power cord into this connector, and the male into a power outlet. Supported input voltages range from 100 ~ 240 VAC at 50 ~ 60 Hz.
- ◆ **Power Switch** This turns the DES-1032 on and off. To turn on the system, press the switch to the “1” position; to turn off, press the switch to the “0” position.

LED Indicators

The LED indicators of the DES-1032 include Power, 100M, Link/Act (Link/Activity) and FDX (Full-duplex). The LED indicators are used to facilitate monitoring and troubleshooting of the DES-1032. The following shows the LED indicators for the DES-1032 along with an explanation of each indicator.



Power LED STATUS LEDs:

- (Green) 10M/100M (Green when the respective port is operating at 100Mbps, yellow when the respective port is operating at 10Mbps)
- Full/Col (Green when full-duplex, yellow when half-duplex or there's a collision occur)

Figure 3.3 The DES-1032 LED indicators

- ◆ **Power** This indicator operates when the DES-1032 is turned on. If this indicator is not lit, check the AC power connector to ensure proper insertion of the power cord and that the power DES-1032 is turned ON.
- ◆ **10/100M** The LED indicator lights **green** when a 100Mbps device is connected to a respective port or the up-link port. If the indicator lights **yellow**, a 10Mbps device is connected to a respective port or the up-link port.
- ◆ **FDX** This LED indicator is **green** when a respective port is in full duplex mode. Otherwise, it is **yellow** for half duplex operation or collisions are occurring.

4

CONNECTING THE DES-1032

This chapter describes how to connect the DES-1032 to your Fast Ethernet network.

DES-1032 to PC

A PC can be connected to the DES-1032 via a Category 3, 4, 5 UTP/STP straight cable. The PC (equipped with a RJ-45 10/100 Mbps jack) should be connected to any of the thirty-two ports (1x -32x) for the DES-1032.

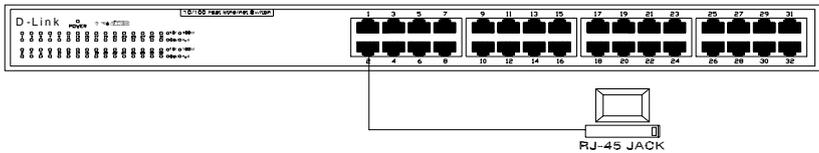


Figure 4.1 DES-1032 connected to a PC or Workstation

The LED indicators for PC connection are dependent on the LAN card capabilities. If LED indicators are not illuminated after making a proper

connection, check the PC's LAN card, the cable, and the conditions and connections.

The following are LED indicator possibilities for a PC to DES-1032 connection:

1. The 100M LED indicator lights green for a 100Mbps and lights yellow for 10Mbps.
2. The Full/Col LED indicator depends upon LAN card capabilities, green for full duplex operation and yellow otherwise.

DES-1032 to Hub (with Uplink)

A hub (10 or 100BASE-TX) can be connected to the DES-1032 via a Category 3, 4, 5 UTP/STP straight cable. The connection is accomplished from the hub's Uplink (MDI-II) port to any of the DES-1032's (MDI-X) ports.

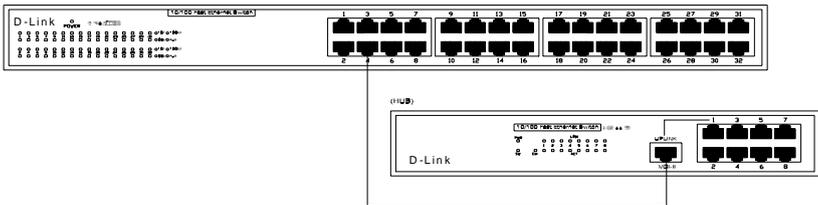


Figure 4.2 DES-1032 connected to a 10 or 100BASE-TX Hub

10BASE-T Hub

For a 10 BASE-T hub, the DES-1032's LED indicators should show the following:

- ◆ 10/100M LED speed indicator is yellow.
- ◆ Full/Col LED indicator is yellow.

100BASE-TX Hub

For a 100Base-TX hub, the DES-1032's LED indicators should show the following:

- ◆ 10/100M LED speed indicator is green.
- ◆ Full/Col LED indicator is green.

Hub without Uplink (MDI-II) port

If a hub is not equipped with an Uplink (MDI-II) port, then a connection can be made using either straight cable or crossover cable (see *Appendix B, Pin Specification* for cable requirement).

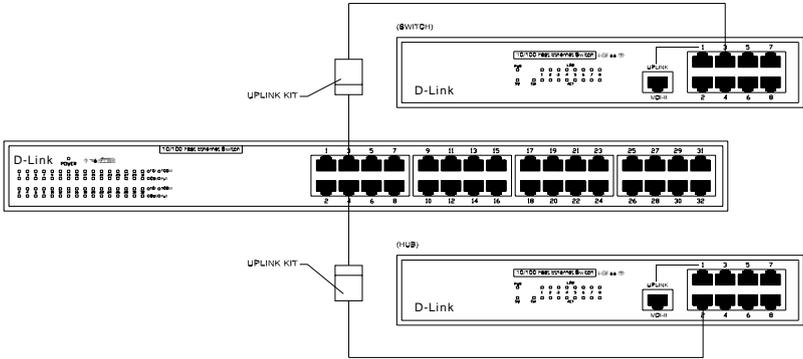


Figure 4.3 DES-1032 connected to a Hub without Uplink (MDI-II) port using the Straight or crossover cable option

Using straight cable

When using straight cable, the connection can be made from the Uplink (MDI-II) port of the DES-1032 to any port of the hub (see figure 11).

Using crossover cable

When using crossover cable, the connection can be made from any MDI-X ports of the DES-1032 to any port of the hub (see Figure 4.2).

DES-1032 to DES-1032 (and/or Hub)

The DES-1032 provides two Uplink ports to connect 2 DES-1032s or hubs using Category 3, 4, 5 UTP/STP straight cable (see *Appendix B, Pin Specification* for cable requirement).

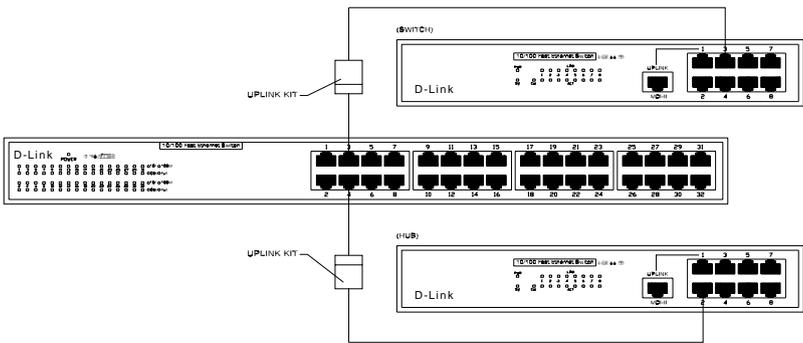


Figure 4.4 DES-1032 to DES-1032/ hub connections using the straight cable.

Using straight cable

When using straight cable, this is done from the Uplink kit of the DES-1032 to any of the 10 Mbps or 100 Mbps (MDI-X) ports of the other DES-1032 or other devices (see Figure 4.4).

Using crossover cable

When using crossover cable, this is done from any (MDI-X) port of the DES-1032 to any of the 10 Mbps or 100 Mbps (MDI-X) ports of the other DES-1032 or other devices.

The DES-1032's LED indicators for the respective connected ports are as follows:

- ◆ 100M is ON for 100BASE-TX, otherwise OFF.
- ◆ Link/Act is ON.
- ◆ FDX depends on the connected switch or other device.



TECHNICAL SPECIFICATIONS

General	
Standards:	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100 BASE-TX Fast Ethernet IEEE 802.3 Frame types: Transparent
Protocol:	CSMA/CD Ethernet
Data Transfer Rate:	Ethernet: Fast Ethernet: 10 Mbps (half duplex) 100Mbps (half duplex) 20 Mbps (full duplex) 200Mbps (full duplex)
Topology:	Star

General	
Network Cabling:	10BASE-T: 2-pair UTP Cat. 3,4,5 (100 m) EIA/TIA- 568 100-ohm STP (100 m) 100BASE-TX: 2-pair UTP Cat. 5 (100 m) EIA/TIA-568 100-ohm STP (100 m)
Number of Ports:	DES-1032: 32 x 10/100 Mbps ports

Physical and Environmental	
AC inputs:	100 - 240 VAC, 50/60 Hz (internal universal power supply)
Power Consumption:	50 watts maximum
DC fans:	2 built-in 40x40 mm fans
Operating Temperature:	41 ° ~ 122 °F (5 ° ~ 50 °C)
Storage Temperature:	-4 ° ~ 149 °F (-20 ° ~ 65 °C)
Humidity:	10% ~ 90% non-condensing
Dimensions:	441 x 192 x 55 mm (1U), 19-inch rack-mount width
Weight:	DES-1032: ??? Kg
EMI:	FCC Class A, CE Mark Class A, VCCI Class A, BCIQ A
Safety:	UL (UL 1950), CSA (CSA950), TUV/GS (EN60950)

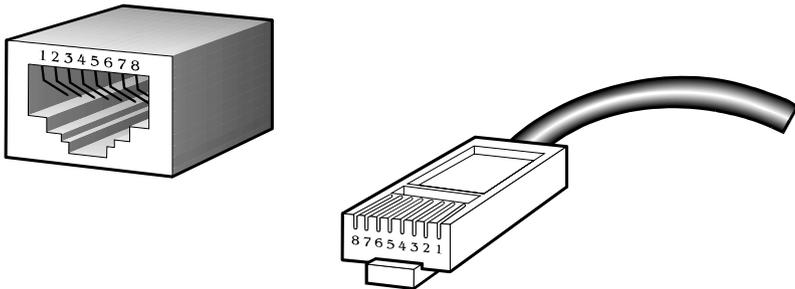
Performance	
Transmission Method:	Fast Store-and-forward
RAM Buffer:	DES-1032: 4 M bytes per device
Filtering Address Table:	1 K active entries per device
Packet Filtering/Forwarding Rate:	14,880 pps per port (for 10Mbps) 148,800 pps per port (for 100Mbps)
MAC Address Learning:	Automatic update Max age: 1 to 5 minutes -or- none



RJ-45 PIN SPECIFICATION

When connecting the DES-1032 to another switch, a bridge or a hub, a modified crossover cable is necessary. Please review these products for matching cable pin assignment.

The following diagram and tables show the standard RJ-45 receptacle/connector and their pin assignments for the switch-to-network adapter card connection, and the straight/ crossover cable for the DES-1032-to-switch/hub/bridge connection.

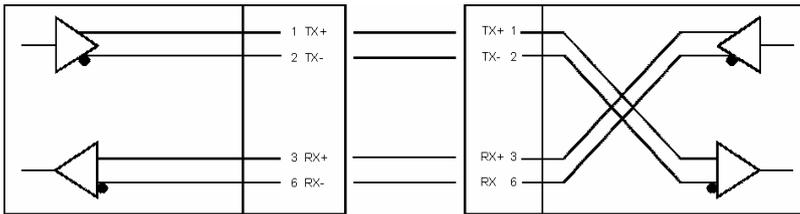


The standard RJ-45 receptacle/connector

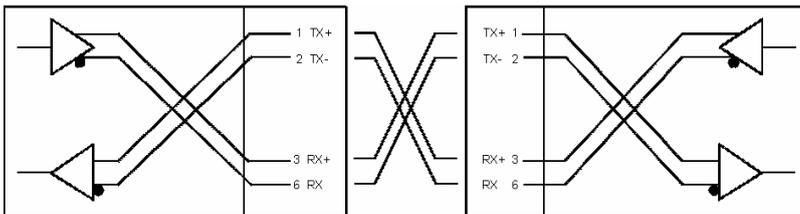
RJ-45 Connector pin assignment	
Contact	Media Direct Interface Signal
1	Tx + (transmit)
2	Tx - (transmit)
3	Rx + (receive)
4	Not used
5	Not used
6	Rx - (receive)
7	Not used
8	Not used

The standard Category 3 cable, RJ-45 pin assignment

The following shows straight cable and crossover cable connection:



Straight cable for DES-1032 (Uplink MDI-II port) to switch/Hub or other devices connection



Crossover cable for DES-1032 (MDI-X port) to switch/hub or other network devices (MDI-X port) connection

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 Organization's full address: _____

 Country: _____
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Product Model	Product Serial No.	* Product installed in type of computer (e.g., Compaq 486)	* Product installed in computer serial No.

(* Applies to adapters only)

Product was purchased from:

Reseller's name: _____
 Telephone: _____ Fax: _____
 Reseller's full address: _____

Answers to the following questions help us to support your product:

1. **Where and how will the product primarily be used?**
Home Office Travel Company Business Home Business Personal Use
2. **How many employees work at installation site?**
1 employee 2-9 10-49 50-99 100-499 500-999 1000 or more
3. **What network protocol(s) does your organization use ?**
XNS/IPX TCP/IP DECnet Others _____
4. **What network operating system(s) does your organization use ?**
D-Link LANsmart Novell NetWare NetWare Lite SCO Unix/Xenix PC NFS 3Com 3+Open
Banyan Vines DECnet Pathwork Windows NT Windows NTAS Windows '95
Others _____
5. **What network management program does your organization use ?**
D-View HP OpenView/Windows HP OpenView/Unix SunNet Manager Novell NMS
NetView 6000 Others _____
6. **What network medium/media does your organization use ?**
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100BASE-TX 100BASE-T4 100VGAnyLAN Others _____
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